SYNTHIAM

<u>synthiam.com</u>

Exosphere Telepresence

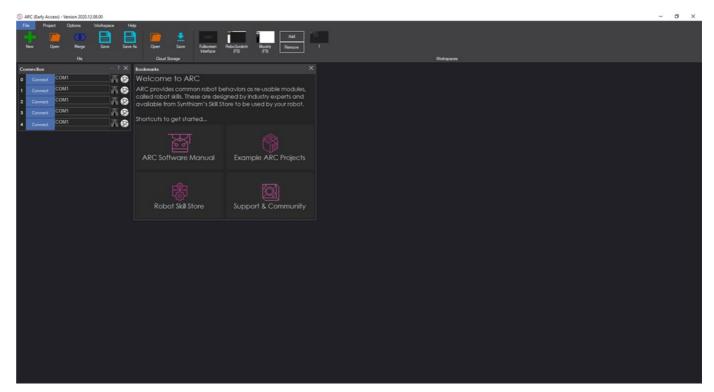
How to configure Exosphere for remote telepresence two-way communication & remote control Last Updated: 12/16/2020

S Add Exosphere Robot Skill

The exosphere robot skill requires at least 1 movement panel and 1 camera. This allows the robot to move and see. Without either of those, the telepresence feature can't be used. Also, the PC powering the robot should have a microphone and speaker, because that allows two way voice communication.

***Remember**:Â Your project can have as many other skills as it needs to operate. But it needs a CAMERA and MOVEMENT PANEL at least.

1. Load latest version of ARC (we recommend Early Access edition to experience the latest fixes and features)



 Load your robot project. Remember, it needs a CAMERA and MOVEMENT PANEL. The robot project should be working so that you can control the robot by the movement panel. Your project can have as many other skills as it needs to operate. But it needs a CAMERA and MOVEMENT PANEL at least.

S ARC (Early Access) - Version 202	0.12.08.00
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3. Select PROJECT -> ADD SKILL

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File	e Projec	ct Options	Workspa	ce Help							
	G		ê	<u>*</u> -							
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2	Connect	COM1		99							
3	Connect	COM1		9							
4	Connect	COM1		P 📀							

4. In the add skill menu, select MACHINE LEARNING -> EXOSPHERE

Add New Robot Skill		C	×
Recent General ADC Artificial Intelligence Audio Camer	a Digital Games GPS Graphs HBridge i2c	Infrared Distance Machine Learning Misc Movement Panels	Navigation Power PWM Rafiki Scripting Servo
Simulation Social Media Ultrasonic User Interface Virtual Re	vality	\sim	
Cosphere			
Auto arrange all controls when a new skill is added to project	🔯 Get More Skills		Close

5. If Exosphere has not been installed, select INSTALL in the popup. Additionally, we recommend reading the MANUAL as well. There's information in the manual that will answer many questions you may have that aren't covered in this tutorial

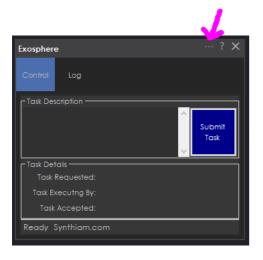
Exosphere	×			
Would you like to view or install Exosphere	/ the online manual			
View Manual	Install			
Cancel				

6. The exosphere skill is now added to your project

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Fi	le Proje	ct Options	Workspa	ace Hel	p						
	Add	Create	ê View	Instructions	Design	Options	Library	Bit Builder	File Load	8 0 Configure	9 0 Advanced
	Robot S	kills		M	ly Robot		EZ	Z-Bits		Servo Profile	
Co	nn e ction			··· ? 🗙	Exosphere			··· ? 🗙			
0	Connect	COM1		R 📀	Control Lo	a					
1	Connect	COM1		R 📀							
2	Connect	COM1		R 📀	Task Descriptio	>n ———	^				
3	Connect	COM1		R 📀				Submit Task			
4	Connect	COM1		R 📀							
					Task Details —						
					Task Reque						
					Task Executr						
					Task Acce	pted:					
					Ready Synthi	iam.com					

We'll now configure the Exosphere robot skill for telepresence operation. We still advise that you visit the Exosphere manual to learn more about the configuration settings and getting Exosphere up and running. This tutorial does not cover all features of the Exosphere skill. All features of the skill are covered in the Exosphere manual. Here is a link to the Exosphere manual:Â https://synthiam.com/Support/Skills/Machine-Learning/Exosphere?id=18753

1. Press the CONFIG button on the exosphere skill



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2. Enter a detailed description of your robot and the title of your robot (what is it's name). Use the *HELP Question marks* for additional information on those inputs and why they matter.

Exosphere Configuration	_	×
General Scripts Advanced User Access		
Robot Robot Make/Model/Title: DJ's Telepresence Robot Robot Description: Custom base with no arms or grippers. There's a pan/tilt servo on the camera.		
Session		
Movement The puppeteer will control the movement panel in this project. If the movement panel supports speed, the max speed settings can be tested and configured here. You will not want the max speed to be too fast, otherwise the robot will be difficult to control. Test your max speed values here. Maximum Joystick Drive Speed 222 Control Control C		
Save Cancel		

3. Test the speeds by driving your robot. These are the speeds that the remote operator will use. Ensure you select maximum speed that is not difficult to control. Slower the better... Make sure you test the keyboard speed as well, because if a remote operator were to use the keyboard, you need to make sure it works for them.

Exosphere Configuration	-	\times
General Scripts Advanced User Access		
Robot Robot Make/Model/Title: DJ's Telepresence Robot Robot Description: Custom base with no arms or grippers. There's a pan/tilt servo on the camera.		
Session Session Password: Minimum Puppeteer Rating: 1		
Movement The puppeteer will control the movement panel in this project. If the movement panel supports speed, the max speed settings can be tested and configured her You will not want the max speed to be too fast, otherwise the robot will be difficult to control. Test you max speed values here. Keyboard Drive Speed: 80 Test Forward Stop		
Save Cancel		

4. In the ADVANCED tab, enable the TELEPRESENCE option. The rest of the default values should be fine. Consider increasing or decreasing the video bitrate and resolution, etc as you see fit based on your network connectivity. This tutorial does not cover all of the features in the Exosphere skill. Please check the Exosphere manual for details of features AND use the blue question marks for help on features.

Exosphere Configuration	_	×
General Scripts Advanced User Access		
Audio Audio Freqency: 32.000 Audio Bit Depth: 16 Audio Channels: 1 Audio Channels: 1		
Video Settings Camera Device: (ANY) Camera Device: (ANY) Video Bitrate: 200000 Output Height 240 Output Height 240 Output Height 240	4	
Telepresence		
Save Cancel		

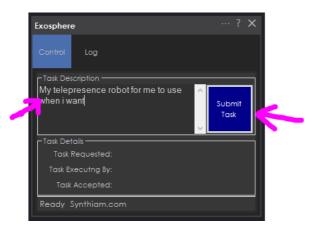
5) Configure the User Access so not just anyone can control your robot. We assume since this is telepresence, that you don't want just anyone picking the robot and driving it around. Enter the Synthiam USERNAMES of users that may operate your robot. \ddot{s}

Exosphere Configuration	- 🗆 X
General Scripts Advanced User Access	
Contorl who has access to your tasks Username Access Type White List Add	Access Types: - Black List: If a user is black listed, they cannot take your task to control your robot. - White List: If a user is white listed, only they can control your robot, and everybody else is blocked. To add a new entry: Enter the username and access type and hit 'Add'. To remove an entry: Select the whole row by clicking on the row header and then hit Delete on your keyboard.
Access Type Username White List amin White List DJ Sures	
Save Cancel	

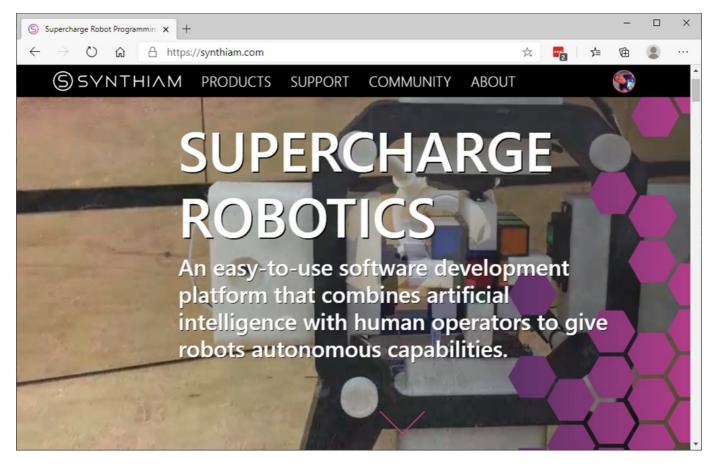


Now we'll create a task description and submit the task to Synthiam. This will make the task appear on the Synthiam website. If you added an access list, only the users added will be able to control the robot.

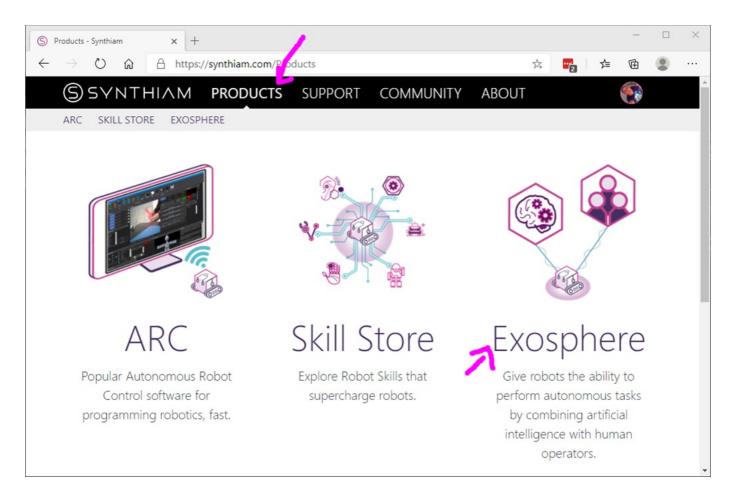
1. Enter the description of the task. This can be something that you can identify what this robot is going to be doing via telepresence operation and press SUBMIT TASK



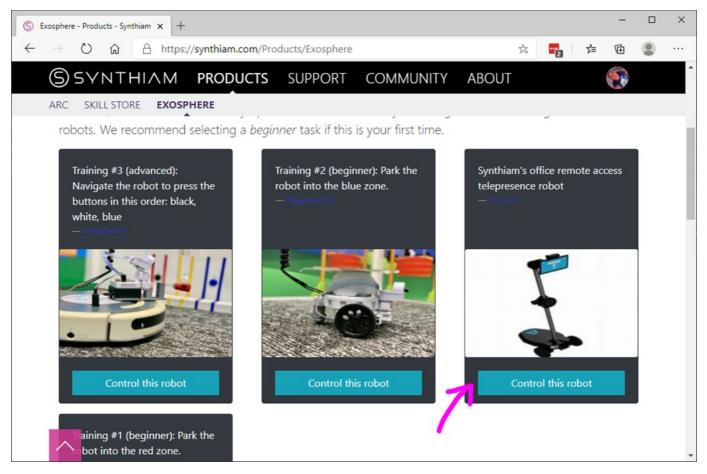
2. On a different computer (or mobile device) than the robot, visit synthiam.com



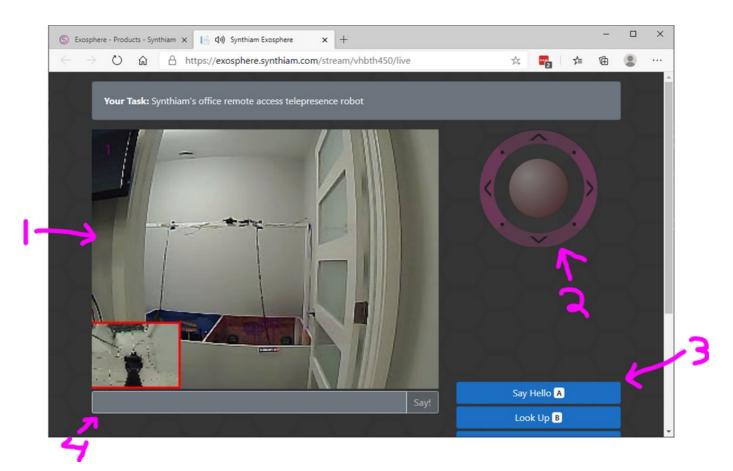
3. Press PRODUCTS -> Exosphere



4. Your task will be listed. Press the CONTROL THIS ROBOT option



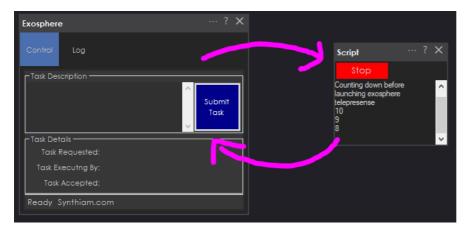
5) A new browser will will display the remote control options. Depending on how you configured the Exosphere robot skill, different scripts and settings will be available to you.



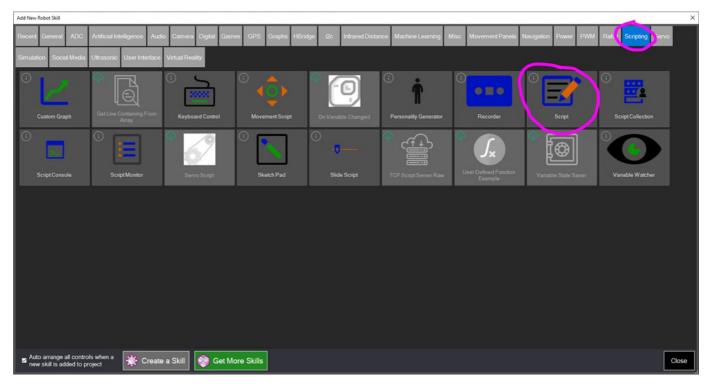
- 1. View of the robot camera
- 2. Analog joystick for driving the robot
- 3. Any custom scripts that you have defined in the Exosphere robot skill
- 4. If enabled, you may also type sentences and the robot will speak them

Once you disconnect from controlling the robot, the task will stop. You may wish to keep the task active for as long as your robot is online. To do this, we'll configure Exosphere to launch a countdown timer to relaunch the task every time.

10 Task is created 20 Remote operator controls robot 30 Remote operator disconnects from robot 40 Exosphere executes TASK COMPLETED script which instructs another script to START 50 Script counts down from 10 every second 60 Script instructs Exosphere to start a task 70 goto 10



1. Add a SCRIPT robot skill. Top menu bar -> Project -> Add Robot Skill -> Scripts -> SCRIPT



2. Press CONFIG button on the script



3. Give the SCRIPT an appropriate name and add a count down code that launches the Exosphere

task. Save this script setting. ``` print("Count down to start Exosphere task");

for (var x = 0; x < 10; x++) {

print(10 - x);

sleep(1000); }

// Make the robot speak for fun Audio.say("Launching telepresence");

ControlCommand("Exosphere", "RequestTask", "My exosphere telepresence task"); ```



4. Press the CONFIG button on the Exosphere robot skill

	1
Exosphere	··· ? X
Control Log	
Task Description	
	Submit Task
Task Details	
Task Requested:	
Task Executng By:	
Task Accepted:	
Ready Synthiam.com	

5. Press SCRIPTS -> TASK COMPLETED SCRIPT

Exosphere Configurati	_		×
General Scripts Advanced User Access			
Task Created Script:			
Task Accepted Script: P			
Task Completed Script:			
These are scripts that will be presented to the Exosphere controller to assist moving your robot. Give the script a simple and cons	ice name and det	ailed	
description. This will help the Exosphere control use your scripts to control the robot.		anca	
Script examples may be moving servos into specific positions or executing Auto Position actions.			
Title Script			
Move Up Move Delete Insert Append			
Move Up Move Delete Insert Append			
Save Cancel			

6. Put a controlcommand in to instruct the Telepresence Start Script to start.

🗟 Event Script Editor	- D X
Blockly JavaScript EZ-Script Python	
Fort Smaller Fort Larger	General Port Summary Cheat Sheet Console Global Variables JavaScript Variables
< ControlCommand("Start Exosphere Telepresence", "ScriptStart"); Rn (4-R)	 Find Next Print Page Setup Save • • JavaScript Functions In addition to the built-in ECMA 5.1 JavaScript classes (outlined below), ARC includes several classes with methods to control your robot, read sensors, interact with the operating system, and more. To view built-in ARC JavaScript methods Check the intellisense checkbox. Type one of the following class names, press ',' and scroll through the available methods. ADC - E2B analog to digital converter functions Audio - streaming audio functions COM - local serial COM port functions Digital - E2B digital 1/0 functions EZB - E2B specific functions for getting voltage and checking connection, etc. File - writing and reading local files I2C - E2B 12C helper functions Movement - movement panel control of directions Net - networking functions Ping - E2B ultrasonic distance sensor functions
Save Cancel	

Finished Now you have an infinite loop of telepresence.